

INTEGRATED CIRCUIT HAVING SELF-ALIGNED METAL CONTACT PLUGS AND METHODS OF FABRICATING THE SAME

ABSTRACT OF THE DISCLOSURE

A microelectronic contact structure, e.g., a contact structure for a capacitor electrode of a DRAM, comprises a first dielectric layer on a substrate, a conductive region disposed on a first dielectric layer, a second dielectric layer on the first dielectric layer and contacting the conductive region at a sidewall of the conductive region, and an etch-stopping dielectric region disposed on the conductive region and having a sidewall in contact with the second dielectric layer. The etch-stopping dielectric region extends laterally beyond the sidewall of the conductive region and has an etching selectivity with respect to the second dielectric layer. A third dielectric layer is disposed on the second dielectric layer and etch-stopping dielectric region. A conductive plug extends through the third dielectric layer and along the sidewall of the etch-stopping dielectric region. For example, the conductive plug may contact a conductive pad formed on a source/drain region of an underlying substrate, and a capacitor may be disposed on the conductive plug, thus providing a capacitor memory cell.